

Results of Percutaneous Surgery of Distal Tibial Fractures by Screwed Plates in a Series of 11 Cases

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Abstract: The management of distal tibia fractures can be challenging because of the scarcity of soft tissue, their subcutaneous nature, and poor vascularity. Classic open reduction and internal fixation require extensive soft tissue dissection and periosteal stripping, with high rates of complications. Minimally invasive plating techniques reduce iatrogenic soft tissue injury and bone damage and preserve the osteogenic fracture hematoma. The purpose of this study is to present the experience of the B4 osteoarticular surgery department, of CHU Hassan II of Fez Morocco, in the percutaneous surgery of tibial shaft fractures by screwed plates. This is a retrospective study between January 2014 and December 2017, including 11 cases of tibial shaft fracture in adults treated with a percutaneous screwed plate.

Keywords: tibial, percutaneous screw plate, minimally invasive technique.

INTRODUCTION

We report the clinical and anatomical results of 11 patients, present a tibial shaft fracture, collected at the B4 trauma surgery department treated by a percutaneous fixation by screwed plate. The objective of this monocentric study is to focus on this surgical technique and present our experience and make a general review of the literary.

METHODS AND PATIENTS

We analyzed the results of the patients, present a fracture of the tibial shaft treated by a percutaneous screwed plate, by antero-intern through an incision of 2 to 3 cm is slipped the plate on the inner side of shaft after reduction under scopic control (Fig 1 and 2).



Fig-1: aspect of minimally invasive percutaneous medial osteosynthesis



Fig-2: scopic control

The functional evaluation is based on the AOFAS score and the consolidation is judged obtained on face and profile incidences. The average follow-up is 20 months. The evaluation parameters included radiological elements: angulation, alignment, rotation disorder. Clinic including the articular amplitudes.

RESULTS

We have 11 patients with an average age of 35 (22 to 48 years). Male predominance. The AO classification arose from efforts to produce a comprehensive system for fractures of the long bones. The distal segment of the tibia is classified as '43' and divided into three types as follows: Type A,

extraarticular fractures; Type B, partial articular fractures, which maintain some continuity between the shaft and the articular surface; and Type C, complete articular fractures. There were 8 AO 43A fractures, 3 AO 43B fractures. 5 patients with fractures of the external malleolus were treated by reduction and fixation with plaque. 4 patients with poorly displaced fractures of the fibula diaphysis were followed by conservative treatment. We operated 7 patients (56%) in the first 24 hours, 4 (33%) in the first 72 hours. Mean post-operative stay of patients at the hospital was 2.6 ± 1.42 days. Average total length of stay in the hospital was 4.6 ± 1.95 days. The patient follow-up period was 14.46 ± 3.73 months.

Table-1: Overall results according bone and functional parameters

Variable	Number of patients
Bone results	
Union	11/11 (100%)
Angular deformities >7°	1/11 (9%)
Leg-length discrepancy > 1.1 cm	0/11 (0%)
Functional results	
Limp	2/11 (18%)
Range of motion of ankle > 20°	1/11 (18%)
Return to preinjury activities	10/11 (90%)
Deep infection	0/11 (0%)

The average duration of fracture consolidation for patients was 19.8 ± 2.99 weeks. The postoperative evaluation was made by the AOFAS score with a mean of 88.3 ± 10.8 (range 54-98). There were 7 patients (60%) excellent, 3 (23.3%) good, 1 patient (6.7%) poor results who developed a fracture hematoma infection, with cutaneous necrosis treated with antibiotic therapy, then skin recovery with good evolution. We had no deep infection or osteomyelitis.

Radiological results were good in 7 cases (63% of cases), satisfactory in 3 cases (27% of cases)

and bad in only 1 case (10% of cases). The complications identified were an infection in one case, fracture hematoma complicated by cutaneous necrosis, treated by ablation of osteosynthesis equipment, antibiotic therapy and fasci-cutaneous fascial flap surgery, the patient presented with ASD. Stiffness of the ankle with a satisfactory functional result after prolonged rehabilitation. There is also a vicious extra articular callus in the same patient with 10 ° recurvatum, no case of nonunion (tableau).

DISCUSSION

Surgical fixation of distal tibia fractures can be difficult, and requires careful preoperative planning. Fracture pattern, soft tissue injury, and bone quality critically influence the selection of fixation technique [1]. Classic open reduction and internal plate fixation require extensive soft tissue dissection and periosteal stripping even in expert hands, with high rates of complications, including infection (range, 8.3%–23%) [2, 3] and delayed union and nonunions (range, 8.3%–35%) [2,3]. Several minimally invasive plate osteosynthesis techniques have been developed, with union rates ranging between 80% and 100% [4, 6, 7, 5]. These techniques aim to reduce surgical trauma and to maintain a more biologically favorable environment for fracture healing. Nevertheless, complications, such as angular deformities greater than 7° (range, 7.1%–35%) [7], hardware failure (range, 0–10%) [7,8], and nonunions (range, 0–20%) [4, 6] have been reported.

CONCLUSION

The percutaneous fixation of tibial puncture fracture by screwed plate is a minimally invasive surgical technique that respects the anatomical particularity (cutaneous and vascular) in the light of our result this procedure gives a good result if the indications are respected; we recommend this minimally invasive technique for tibial puncture fractures.

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